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ABSTRACT

A system for effective collection of classroom observation data from teachers in schools was developed. Drawing on the Flanders Interaction Analysis System, a procedure for coding classroom interaction into 10 categories, a system was developed to collect direct observation data with microcomputers. Software was prepared for Tandy computers. Field testing throughout 1987 is projected to continue into 1988, with large-scale field trials planned for 1988. An appendix contains the complete program for use with a 10-category Flanders system, but modifications are available to create larger matrices. (SLD)

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REPORT 87-2-4

INSTRUMENTATION FOR A TEACHER EDUCATION EVALUATION PROJECT

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Report 87-2-4

INSTRUMENTATION FOR A TEACHER EDUCATION EVALUATION PROJECT[1]

Center for Teacher Education Evaluation

Tennessee Technological University

(A Final Report Submitted to the Tandy Educational Foundation)

Prepared By

Jerry B. Ayers and Sandra D. Miles

Center for Teacher Education Evaluation
Tennessee Technological University
Cookeville, TN 38505

October, 1987

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[1]The development of these materials was conducted as a part of the activities of the Center for Teacher Education Evaluation, Tennessee Technological University through a grant from the State of Tennessee. Computer equipment and software were donated by the Tandy TRS-80 Educational Grants Program.

Preface

In January of 1986, Tennessee Technological University was awarded a grant of computer hardware, software and supporting materials from the Tandy Educational Foundation. The purpose of the project was to develop materials that would allow for the more effective and efficient collection of data through classroom observation of teachers. In turn the data could be used to help institutions of higher education improve their programs for the preparation of teachers.

The project became operational in July of 1986 with the help of Mr. David Anderson and Mr. Robert Wynn, graduate students in the College of Engineering at Tennessee Technological University. These individuals carried our some of the preliminary programming work. Early field trials of the software and computers were conducted with the assistance of Ms. Annetta Gilliam, a graduate research assistant in the College of Education.

In the fall of 1986, Ms. Sandra D. Miles joined the project and was responsible for the major programming and field trials that were described in this final report. Thanks are extended to all of the above individuals and to the teachers and principals of the schools in which field trails were undertaken. Further, the Director of the Center for Teacher Education Evaluation would like to thank the Tandy Educational Foundation for its support of the work described in this report.

Jerry B. Ayers, Director
Center for Teacher
Education Evaluation
TennesseeTechnological Univ.
October, 1987

INSTRUMENTATION FOR A TEACHER EDUCATION EVALUATION PROJECT

During the past 15 years, Tennessee Technological University has been actively improving its teacher education programs through systematic evaluation efforts. In 1986, the State of Tennessee through the Centers of Excellence Program established at the institution a Center for Teacher Education Evaluation. The major goals of the Center were to develop models for evaluating teacher education programs, conducting research in related areas in conducting dissemination activities. The project funded through the Tandy Educational Foundation has contributed to the success of the Center and the work will ultimately be of value to other institutions of higher education, state departments of education and others.

Background Information for Project

The National Commission on Excellence in Education (1983) and some 25 other studies published since 1983 examined in depth the problems of education in the United States. The nation is responding to the need to improve education from kindergarten through graduate school (U. S. Department of Education, 1984). For example as of June 1985, 46 states had passed or were considering major legislation to improve education (SREB, 1985).

The mandates of legislation passed in such states as Alabama, Georgia, Kentucky, Tennessee and Texas make it imperative that higher education develop better methods for the preparation of teachers and other personnel to work in the schools and to improve the quality of its programs. In order to develop and implement improved programs adequately for the preparation of teachers there is an urgent need to develop methods that will allow for objective evaluations of teacher education programs. J. T. Sandefur (1983), a leading authority on teacher education program evaluation and a Past-President of the American Association of Colleges for Teacher Education, pointed out that it is imperative that more work be conducted to develop

> ..... effective, functional systems that can be used to evaluate graduates of teacher preparation programs and to provide developmental feedback that can be used for program development and improvement.

The American Association of State Colleges and Universities (1985) indicated a major effort needs to be undertaken in the United States that builds "new strategies for ensuring the quality of education graduates." To meet these ends there is a need for the development and implementation of comprehensive systems for the evaluation of programs for the preparation of teachers at both the preservice and inservice levels.

The purpose of the Tandy Project was to develop a system that would allow for more effective means of collecting classroom observation data from teachers in the schools. The system that

was developed with through this grant will not only help institutions of higher education improve their programs but can also help teachers improve their classroom performance, and aid in the process of developing more objective systems for the evaluation of teachers.

During the past 15 years a modest project designed to collect empirical data for use in the improvement of higher education programs for the preparation of teachers was conducted at Tennessee Technological University. The project was cited as being exemplary for the evaluation of teacher education programs. A major component of the project was the collection of data from the graduates of the program after they enter the teaching profession. This was accomplished by direct observation of the climate of the classroom by trained observers. The process was labor intensive and there was a need for an improved method for the collection and in particular the analysis of the data.

Needs Assessment

The development and implementation of evaluation models is critical to the process of changing and improving programs for the preparation of teachers. The need to evaluate programs for the preparation of teachers and to follow up graduates has always existed, yet there has been a dearth of models and procedures for conducting the needed studies. For years, many institutions have conducted very limited followup studies of their graduates. These studies have consisted largely of asking the graduates to indicate how well they were doing as teachers and requesting them to make suggestions for improvements in the teacher preparation programs they had completed.

The need for institutions of higher education to evaluate their teacher education programs and their graduates was given added emphasis when the 1970 Standards for Accreditation of Teacher Education were adopted by the National Council for Accreditation of Teacher Education. Evaluation was given further emphasis in the 1979 revision of the Standards, and the NCATE redesign that became operational in 1987 puts even more emphasis on program improvement through systematic means. Nationally, in a given year from 10 to 30 percent of all institutions are denied accreditation for one or more programs. The most sensitive standards are related to program design and evaluation (Christensen, 1984). Obviously, if institutions are not meeting the standards related to evaluation, they are not strengthening and improving their teacher education programs. Program improvement in teacher education is vital to the well being of the nation.

Efforts have been made to develop cost efficient and effective models for use in teacher education evaluation. Other models have been described in the literature that are useful for gathering empirical data that in can be used to evaluate programs for the preparation of teachers. Many of these models depend upon direct observation of teachers in the classroom.

The development of classroom observation systems dates back more than 50 years. Probably the best known system in use in the past 25 years was the Flanders Interaction Analysis System (Flanders & Amidon, 1981). This system is a procedure for coding classroom interaction into ten categories. A trained observer records numerical code symbols at least every three seconds to represent the communication events among students and between students and the teacher. Thus over a period of ten minutes over 200 code symbols would be recorded and in an hour over 1,200. This data can be used, for example, to determine the techniques that a teacher may be using in the classroom and classroom effectiveness. Data of this nature is useful in determining weaknesses in a teacher's background and possible areas that should be changed and improved in a teacher education program.

Systems have been developed in recent years whereby data from the Flander's system can be recorded in the classroom directly into mainframe computers. Also, techniques and software have been developed for use with microcomputers for data reduction. However, there is a need for other work in this area.

New systems are being continually developed to collect data in the classroom through direct observation. However, the collection of data by traditional hand methods and then reduction either by hand or with the aid of microcomputers is time consuming in terms of resources. There is a need for the development of more efficient means for collecting of all types of observational data in the classroom in such a manner that it can be recorded directly into a computer system.

Objectives of the Tandy Project

Following were the objectives of the project. The objectives were broad in order to show the full spectrum of impact that the project could make.

1. Develop several systems that could be employed with microcomputers to collect direct observation data in the classrooms of teachers.

2. Field test the systems and compare the results obtained by observers using hand methods.

3. Develop and implement improved systems for data reduction and analyses via microcomputers.

4. Develop methods for incorporating the newly developed systems into existing teacher education program evaluation models and into other systems of teacher evaluation and improvement.

5. Disseminate the results of the project to the educational community.

The immediate benefits of the grant were to Tennessee Technological University. The results of this work will help improve an existing model for the evaluation of teachers and in turn a program for their preparation. This report is the first step in wider dissemination of the results of the project.

The results of the project provide immediate benefits from the standpoint of an improved systems component that can be used in teacher education program evaluation models. The observation of teachers can be accomplished at a reduced cost and give more reliable and valid data. In turn it will make it possible for institutions to improve their programs for the preparation of teachers at a greatly reduced level of cost.

The Radio Shack equipment is reasonable portable yet very efficient. The equipment can be used for the development of needed software and in the classroom to collect data in a discrete and efficient manner. The data can be analyzed on the spot or transferred to larger computers for incorporation with other data and for further analyses.

The project is leading to an improved system for collecting direct classroom observation data. In turn this data can be used for the improvement of programs for the preparation of teachers, and in the efforts of school systems to evaluate teachers and provide needed inservice work. If the project is successful it could be disseminated across the country.

Activities

The initial time frame established for the project was arbitrary and had to be adjusted based on the announcement of funding. The award announcement was received in early January 1986, however, all of the equipment and software was not received until October. Five major activities have taken place or will over by June of 1988.

The initial activity consisted of the acquisition of the needed equipment and software and testing of the equipment. Initially it had been assumed that all equipment, software, and materials would be in hand by March 31, 1986. The last software packages were not received until October. Also, there were some initial delays because of malfunction of both microcomputers. In one cases the unit had to be sent to Nashville on three occassions for repair. sufficient equipment and software were available to begin some activities in June of 1986.

During the period from June 25 through about October 31, 1986, the project center on the development of the needed software for conducting the project. Originally it had been intended to carryout all programming in PASCAL. However, support for the PASCAL compiler was discontinued by Radio Shack and it was necessary to conduct all programming using FORTRAN. A later section in this report contains the programs developed and samples of the type output possible. During this period limited

field trials were made in demonstration classrooms in in the immediate vicinity of Tennessee Technological University.

Throughout 1986-87 some field testing of the new systems were conducted. Also, during this period some limited controlled experiments were conducted to determine the validity and reliability of the developed systems when compared with the same data collected by classroom observers. Results indicated that the use of the computer was as efficient as collecting observation via use of pencil and paper. The time required for data analysis per series of observations was reduced from several hours to less than 5 seconds.

Beginning in the late fall of 1987 and extending through the summer of 1988 the software and systems that were field tested will be revised and refined. More thorough documentation than contained in this report will be completed on all materials developed. It is anticipated that aspects of the project will be incorporated into the program evaluation model activities of the Center for Teacher Education Evaluation.

The materials will be ready for large scale field trials no later than September, 1988. Thereafter, commercial help may be requested in the full dissemination of the materials that were developed as part of the activities of the project. Also, help will be provided to other institutions on the implementation and use of the materials and systems developed as a part of the activities of the project.

Equipment and Software List

The items chosen for the project were based on the best available information related to their use and compatability with existing hardware and software available to the project staff. The equipment is portable and can be moved from classroom to classroom. Special equipment and supporting software were requested in order to carry out the necessary research and development work. Table 1 (next page) shows a complete list of the equipment and other items provided by the Tandy Educational Foundation. The total value of the computer hardware, software and accessories was $6,308.

Process-Product Evaluation

The major objective of the project was the development of software that could be used with microcomputers to collect and analyze classroom observation data. The success of this objective can be measured in terms of the ease of use of the materials and equipment to collect data. The question is, can an individual be taught in a more efficient manner, in terms of resources, to collect classroom observation data? The answer is yes. The Appendix to this report contains the complete program for use with a ten-category Flanders Interaction Analysis system. Modifications are available for use with the program to create matricies that range up to a 16 x 16. There are limitations,

however, with larger matricies because of the available computer storage.

Table 1

Description	Qty.
Model 4D	2
4D Modem Board	2
64K RAM Kit	2
Model III/4 RS-232C Serial Communications Board and Cable	2
DC 2212 Modem	2
DWP 510 Printer	1
Parallel Printer Cable	1
Model 4 High-Resolution Graphics	1
Formation Forms Management System	1
pfs:file	1
pfs:report	1
BASCOM-4	1
BFBLIB BASIC Routines Diskette	1
FORTRAN	1
SuperSCRIPSIT	1
5 1/4" Double Density Diskettes-10 Pack	5
Diskette File Boxes	2
Carton-2,500 Sheets Paper	1

The second objective of the project centered on the collection of data in the classrooms of teachers. Again, quasi-experimental designs were used to compare the efficiency (validity and reliability) of data collection via computer techniques versus collection by hand. The results indicated that valid and reliable data could be collected via the use of the developed system. The time required for data analysis are greatly reduced with the system.

In both objectives, the question was could someone be trained more efficiently to collect data and effect a reduction in the use of resources?. The answer is yes.

The real test of the results of the project will be the number of institutions and agencies that actually adapt or adopt the new system(s) for their use. Records will be kept of the number of requests for information, use of the materials, and the amount of material disseminated throughout the United States. Also, a crude measure of success of the project will be the number of papers accepted for publication and presentations made at professional meetings and the success of the investigators in disseminating the materials through commercial sources.

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APPENDIX

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C       THIS PROGRAM ENABLES THE USER TO EVALUATE A TEACHER'S PERFORMANCE
C       USING THE FLANDERS SYSTEM OF INTERACTION ANALYSIS.  THE OBSERVER
C       TAKES BOTH THE COMPUTER TERMINAL AND THE COMPUTER PRINTER (IF PRINT-
C       OUTS OF DATA ARE DESIRED) INTO THE CLASSROOM WHICH WILL BE OBSERVED.

C       THE USER WILL PLACE THE DISK 'EVAL/FOR' IN THE LOWER DISK DRIVE
C       (DISK DRIVE 0) AND THE DISK 'EVAL/DAT' IN THE UPPER DISK DRIVE
C       (DISK DRIVE 1).  THE COMPUTER IS THEN READY TO BE TURNED ON.
C       WHEN 'TRSDOS READY' APPEARS  ON THE SCREEN, THE USER MAY THEN
C       ACTIVATE THE PROGRAM BY TYPING 'EVAL' AND THEN PRESSING 'ENTER.'
C       THE USER WILL FIRST BE ASKED TO INPUT SEVERAL ITEMS OF INFORMATION
C       CONCERNING THE TEACHER FOR WHICH THE OBSERVATION IS RECORDED
C       SUCH AS NAME, SCHOOL NUMBER, GRADE LEVEL, ETC.  THE USER WILL SIMPLY
C       TYPE IN THE INFORMATION AS REQUESTED, PRESSING 'ENTER' WHEN HE/SHE
C       HAS FINISHED THE ITEM.  ANY INCORRECT INFORMATION MAY BE EDITED
C       BY USING THE ARROW WHICH POINTS TO THE LEFT BEFORE PRESSING 'ENTER.'

C       UPON COMPLETION OF THE DEMOGRAPHIC DATA, THE COMPUTER SCREEN WILL
C       SHOW THE 'CODE' FOR THE FLANDERS SYSTEM OF INTERACTION ANALYSIS.
C       THE NUMBERS ONE THROUGH TEN ARE USED TO DESCRIBE STUDENT-TEACHER
C       INTERACTION OCCURING IN THE CLASSROOM.  THE USER IS ASKED IF HE WOULD
C       LIKE A COPY OF THE 'CODE'; HE/SHE MAY RECEIVE ONE BY ANSWERING 'Y'
C       TO THE QUESTION.  THE OBSERVER IS THEN READY TO BEGIN RECORDING
C       CLASSROOM INTERACTIONS.  EVERY THREE SECONDS HE/SHE IS TO TYPE IN THE
C       NUMBER OF THE INTERACTION CODE AND PRESS 'ENTER.'   THE OBSERVER CON-
C       TINUES THIS PROCESS FOR TWENTY MINUTES.  AT ANY TIME, IF THE USER
C       WISHES TO TERMINATE THE PROGRAM, HE/SHE MAY DO SO BY ENTERING '11'.

C       UPON COMPLETION OF THE 400-ITEM OBSERVATION, THE USER WILL BE ASKED
C       IF HE/SHE WISHES TO RECEIVE A PRINTOUT OF THE RESULTS.  THE USER
C       WILL RESPOND 'Y' OR 'N'.  THE COMPUTER WILL HAVE TABULATED THE
C       OBSERVER CODES IN AN INTERACTION MATRIX, IDENTICAL TO THE ONE THAT
C       THE OBSERVER WOULD HAVE FORMERLY DRAWN BY HAND.  BOTH TOTAL AND PER-
C       CENTAGE MATRICES WILL BE GIVEN.

C       SUBSEQUENT OBSERVATIONS MAY BE MADE ON THE SAME TEACHER BEFORE TURNING
C       OFF THE COMPUTER TERMINAL.  THE OBSERVER WILL BE ASKED IF HE/SHE
C       WISHES TO MAKE ANOTHER OBSERVATION AND WILL RESPOND 'Y' OR 'N'.  IF
C       ADDITIONAL OBSERVATIONS ARE MADE, THE OBSERVER WILL RECEIVE ON THE
C       SCREEN (AND IN PRINT, IF DESIRED) BOTH INDIVIDUAL MATRICES FOR EACH
C       OBSERVATION AND COMPOSITE MATRICES REPRESENTING ALL OBSERVATIONS.
C       THE OBSERVER MAY MAKE UP TO FIVE OBSERVATIONS AT ONE SITTING.  IF THE
C       OBSERVER WISHES TO KEEP A RECORD OF THE DATA AND MATRICES PRODUCED,
C       HE/SHE MUST EITHER REQUEST A PRINTOUT WHEN ASKED TO OR RETAIN THE DISK
C       DISK.  (THE DISK IS OPENED EACH TIME A NEW PROGRAM IS BEGUN, SO
C       PREVIOUS DATA IS NOT RETAINED ON THE DISK.)  THE USER MAY WISH TO
C       RECORD TEACHERS ON INDIVIDUAL DISKS AND FILE THE DISKS OR FILE
C       PRINTOUTS OF EACH TEACHER'S DATA.  (PRINTOUTS ARE SECURED IN 2 WAYS:
C       1) BY GETTING A PRINTOUT WHEN THE USER IS ASKED IF ONE IS DESIRED
C       DURING OPERATION OF THE PROGRAM; AND 2) FOLLOWING THE OBSERVATION
C       SESSION, BY PLACING THE 'EVAL/FOR' DISK IN DRIVE 0 AND THE 'EVAL/DAT'
C       DISK IN DRIVE 1 AND, AT THE TRSDOS PROMPT, TYPE 'LIST EVAL/DAT:1(PRT)'
C       AND PRESSING 'ENTER.')

C       QUESTIONS REGARDING THIS PROGRAM AND ITS USE MAY BE ADDRESSED TO:

C                       Center for Teacher Education Evaluation
C                       Tennessee Technological University
C                       P.O. Box 5207
C                       Cookeville, TN  38505
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```
      PROGRAM EVAL
      DIMENSION PER(10,5)
      INTEGER GRADE,SCNO,SYNO,A,B,M(10,10,5),MT(10,5)
      INTEGER MTT(5),FI(400),MTTl
      REAL IPER(10,10,5)
      BYTE NAME(30),SEX,SCHOOL(40),SUBJ(25),DATE(8),YOU(30)
      BYTE ANS(1),ANS2(1),ANS3(1),SEX
      REAL PER1(10),IPER1(10,10)
      INTEGER M1(10,10),MT1(10)

      CALL OPEN (6,'EVAL/DAT:1',255)
      WRITE(1,2)
    2 FORMAT(12X,'TEACHER EVALUATION USING THE FLANDERS SYSTEM')
      WRITE(1,4)
    4 FORMAT(22X,'OF INTERACTION ANALYSIS')
      WRITE(1,3)
    3 FORMAT(1X,'------------------------------------------------------------
     4 ------------'/)

    1 WRITE(1,10)
   10 FORMAT(1X,'PLEASE INPUT THE FOLLOWING PARAMETERS:'/)
      WRITE(1,12)
   12 FORMAT(1X,'(Type in information and press return)'/)
      WRITE(1,40)
   40 FORMAT(1X,'TEACHER NAME (last name first):   ')
      READ(3,50)(NAME(I),I=1,30)
   50 FORMAT(30A1)
      WRITE(1,60)
   60 FORMAT(1X,'TEACHER SEX (M or F):   ')
      READ(3,70)SEX
   70 FORMAT(A1)
      WRITE(1,80)
   80 FORMAT(1X,'TEACHER ID NUMBER:   ')
      READ(3,90)ID
   90 FORMAT(I5)
      WRITE(1,100)
  100 FORMAT(1X,'TEACHER SUBJECT:   ')
      READ(3,110)(SUBJ(I),I=1,25)
  110 FORMAT(25A1)
      WRITE(1,120)
  120 FORMAT(1X,'GRADE:   ')
      READ(3,130)GRADE
  130 FORMAT(I2)
      WRITE(1,140)
  140 FORMAT(1X,'SCHOOL:   ')
      READ(3,150)(SCHOOL(I),I=1,40)
  150 FORMAT(40A1)
      WRITE(1,160)
  160 FORMAT(1X,'SCHOOL NUMBER:   ')
      READ(3,170)SCNO
  170 FORMAT(I4)
      WRITE(1,180)
  180 FORMAT(1X,'SYSTEM NUMBER:   ')
      READ(3,190)SYNO
  190 FORMAT(I3)
      WRITE(1,200)
  200 FORMAT(1X,'DATE (month/date/year):   ')
      READ(3,210)(DATE(I),I=1,8)
```

```
      WRITE(1,215)
  215 FORMAT(1X,'OBSERVER:   ')
      READ(3,216)(YOU(I),I=1,30)
  216 FORMAT(30A1)

C     BELOW IS AN EXPLANATION OF THE FLANDERS SYSTEM OF INTERACTION
C     ANALYSIS CODES.

      WRITE(1,320)
  320 FORMAT('0',15X,'FLANDERS SYSTEM OF INTERACTION ANALYSIS')
      WRITE(1,330)
  330 FORMAT(10X)
      WRITE(1,340)
  340 FORMAT('0',9X,'CODE:',10X,'OBSERVED BEHAVIOR:')
      WRITE(1,350)
  350 FORMAT('0',11X,'1',12X,'Teacher accepts feeling')
      WRITE(1,360)
  360 FORMAT(12X,'2',12X,'Teacher praises or encourages')
      WRITE(1,370)
  370 FORMAT(12X,'3',12X,'Teacher accepts or uses ideas of students')
      WRITE(1,380)
  380 FORMAT(12X,'4',12X,'Teacher asks questions')
      WRITE(1,390)
  390 FORMAT(12X,'5',12X,'Teacher lectures')
      WRITE(1,400)
  400 FORMAT(12X,'6',12X,'Teacher gives directions')
      WRITE(1,410)
  410 FORMAT(12X,'7',12X,'Teacher criticizes or justifies authority')
      WRITE(1,420)
  420 FORMAT(12X,'8',12X,'Student talks--response')
      WRITE(1,430)
  430 FORMAT(12X,'9',12X,'Student talks--initiation')
      WRITE(1,440)
  440 FORMAT(11X,'10',12X,'Silence or confusion'///)
      WRITE(1,450)
  450 FORMAT(1X,'Would you like a printout of the codes (Y or N)? ')
      READ (3,460)ANS(1)
  460 FORMAT(A1)
C     THE FOLLOWING ASKS IF ANS(1) .NE. 'Y' !!!   -JLS
      IF  (ANS(1).NE. 89) GO TO 570
         WRITE(2,320)
         WRITE(2,330)
         WRITE(2,340)
         WRITE(2,350)
         WRITE(2,360)
         WRITE(2,370)
         WRITE(2,380)
         WRITE(2,390)
         WRITE(2,400)
         WRITE(2,410)
         WRITE(2,420)
         WRITE(2,430)
         WRITE(2,440)

C     THE USER IS READY TO RECORD THE OBSERVED CLASSROOM BEHAVIOR.

  570 WRITE(1,480)
  480 FORMAT(1X)
      II=0
  481 WRITE(1,490)
  490 FORMAT(1X,'Enter the code for classroom behavior every three ')
      WRITE(1,491)
  491 FORMAT(1X,'seconds.  You should not wait longer than eight ')
      WRITE(1,492)
  492 FORMAT(1X,' minutes from now before beginning this process.'//)
      write(1,500)
  500 FORMAT(1X,'If you wish to start over at any time, press 0 and ')
      WRITE(1,501)
```

```
501   FORMAT(1X,'"enter."  If you wish to end the program, press 11 ')
      WRITE(1,502)
502   FORMAT(1X,'and then "enter."'//)
      WRITE(1,510)
510   FORMAT(1X,'Otherwise, press (1)the code for the behavior you ')
      WRITE(1,511)
511   FORMAT(1X,'observe and (2)"enter."  Be accurate.  You will ')
      WRITE(1,512)
512   FORMAT(1X,'record for twenty minutes.'//)
      WRITE(1,513)
513   FORMAT(10X)
516   WRITE(1,514)
514   FORMAT(1X,'BEGIN NOW:'///)
      I1=I1+1
      DO 300 J=1,400
         IF (J.EQ.391) WRITE(1,515)
515         FORMAT(1X,'Ten more entries will complete your data'/)
         READ(3,310)FI(J)
310      FORMAT(I2)
         IF (FI(J).EQ.0) GOTO 1
         IF (FI(J).EQ.11) GOTO 301
300   CONTINUE
      DO 535 L=1,10
         DO 536 K=1,10
            M(L,K,I1)=0
536      CONTINUE
535   CONTINUE
      DO 540 K=2,400
         A=FI(K-1)
         B=FI(K)
         M(A,B,I1)=M(A,B,I1) + 1
540   CONTINUE
      DO 580 I=1,10
         MT(I,I1)=0
580   CONTINUE
      DO 590 I=1,10
         DO 600 J=1,10
            MT(I,I1)=MT(I,I1) + M(I,J,I1)
600      CONTINUE
590   CONTINUE
      MTT(I1)=0
      DO 610 I=1,10
         MTT(I1)=MTT(I1) + MT(I,I1)
610   CONTINUE
      IF (MTT(I1).GT.0) DO 640 I=1,10
         PER(I,I1)=(MT(I,I1)*100.)/MTT(I1)
640   CONTINUE
      IF (MTT(I1).GT.0) DO 780 I=1,10
         DO 790 J=1,10
            IPER(I,J,I1)=M(I,J,I1)*100./MTT(I1)
790      CONTINUE
780   CONTINUE
      DO 880 I=1,10
         DO 890 J=1,10
            M1(I,J)=0
            MT1(I)=0
            MTT1=0
            PER1(I)=0
            IPER1(I,J)=0
890      CONTINUE
880   CONTINUE
      IF (I1.GT.1) DO 900 I=1,10
         DO 910 J=1,10
            M1(I,J)=M(I,J,I1)+M1(I,J)
910      CONTINUE
```

```
 900  CONTINUE
      IF (I1.GT.1) DO 901 I=1,10
         DO 902 J=1,10
            MT1(I)=MT1(I)+M1(I,J)
 902     CONTINUE
 901  CONTINUE
      IF (I1.GT.1) DO 903 I=1,10
         MTT1=MTT1+MT1(I)
 903  CONTINUE
      IF (I1.GT.1) DO 904 I=1,10
         IF (MTT1.GT.0) PER1(I)=(MT1(I)*100.)/MTT1
 904  CONTINUE
      IF (I1.GT.1) DO 905 I=1,10
         DO 906 J=1,10
            IF (MTT1.GT.0) IPER1(I,J)=M1(I,J)*100./MTT1
 906     CONTINUE
 905  CONTINUE
 301  WRITE(1,660)
 660  FORMAT(29X,'DATA SUMMARY'/)
      WRITE(1,670)
 670  FORMAT(1X,69('-')///)
      WRITE(1,680)(NAME(I),I=1,30)
 680  FORMAT(24X,'Teacher Name:  ',30A1)
      WRITE(1,690)SEX
 690  FORMAT(24X,'Teacher Sex:  ',A1)
      WRITE(1,700)ID
 700  FORMAT(24X,'Teacher ID Number:  ',I5)
      WRITE(1,710)(SUBJ(I),I=1,25)
 710  FORMAT(24X,'Teacher Subject:  ',25A1)
      WRITE(1,720)GRADE
 720  FORMAT(24X,'Grade:  ',I2)
      WRITE(1,730)(SCHOOL(I),I=1,40)
 730  FORMAT(24X,'School:  ',40A1)
      WRITE(1,740)SCNO
 740  FORMAT(24X,'School Number:  ',I4)
      WRITE(1,750)SYNO
 750  FORMAT(24X,'System Number:  ',I3)
      WRITE(1,760)(DATE(I),I=1,8)
 760  FORMAT(24X,'Observation Date:  ',8A1)
      WRITE(1,770)(YOU(I),I=1,30)
 770  FORMAT(24X,'Observer:  ',30A1///)
      WRITE(1,550)
 550  FORMAT(30X,'DATA MATRIX'//)
      WRITE(1,555)(I,I=1,10)
 555  FORMAT(1X,10X,10(I3,3X))
      WRITE(1,556)
 556  FORMAT(1X,70('-')/)
      WRITE (1,560) (J,(M(I,J,I1),I=1,10),J=1,10)
 560  FORMAT(1X,I3,'/',6X,10(I3,3X)/)
      WRITE(1,620) (MT(I,I1),I=1,10)
 620  FORMAT (1X,'TOTALS:'3X,10(I3,3X)/)
      WRITE(1,630)MTT(I1)
 630  FORMAT(1X,'MATRIX TOTAL = ',I4)
      WRITE(1,650)(PER(I,I1),I=1,10)
 650  FORMAT(1X,'PERCENT:',10(F5.1,1X)///)
      WRITE(1,800)
 800  FORMAT(27X,'PERCENTAGE MATRIX'//)
      WRITE(1,810)(I,I=1,10)
 810  FORMAT(11X,10(I4,2X))
      WRITE(1,556)
      WRITE(1,820)(J,(IPER(I,J,I1),I=1,10),J=1,10)
 820  FORMAT(1X,I3,'/',6X,10(F4.1,2X)/)
      WRITE(1,821)
 821  FORMAT(//)
      IF (I1.EQ.1) GO TO 1025
      WRITE(1,920)
```

```
  920   FORMAT(27X,'TOTAL OF MATRICES'//)
        WRITE(1,930) (I,I=1,10)
  930   FORMAT(11X,10(I3,3X))
        WRITE(1,940)
  940   FORMAT(1X,70('-')/)
        WRITE(1,950)(J,(M1(I,J),I=1,10),J=1,10)
  950   FORMAT(1X,I3,'/',6X,10(I3,3X)/)
        WRITE(1,960)(MT1(I),I=1,10)
  960   FORMAT(1X,'TOTALS:',3X,10(I3,3X)/)
        WRITE(1,970)MTT1
  970   FORMAT(1X,'CUMULATIVE TOTAL OF ALL MATRICES:',I5)
        WRITE(1,980)(PER1(I),I=1,10)
  980   FORMAT(1X,'PERCENT:',10(F5.1,1X)///)
        WRITE(1,990)
  990   FORMAT(21X,'AVERAGE PERCENTAGES OF ALL DATA'//)
        WRITE(1,1000)(I,I=1,10)
 1000   FORMAT(11X,10(I4,2X))
        WRITE(1,1010)
 1010   FORMAT(1X,70('-')/)
        WRITE(1,1020)(J,(IPER1(I,J),I=1,10),J=1,10)
 1020   FORMAT(1X,I3,'/',6X,10(F4.1,2X)/)
 1025   WRITE(1,1030)
 1030   FORMAT(//////)
        WRITE(1,651)
  651   FORMAT(1X,'Do you want a printout of data and results (Y,N)?')
        READ(3,652)ANS2(1)
  652   FORMAT(A1)
        IF (ANS2(1).EQ.78) GO TO 653
        WRITE(2,660)
        WRITE(2,670)
        WRITE(2,680)(NAME(I),I=1,30)
        WRITE(2,690)SEX
        WRITE(2,700)ID
        WRITE(2,710)(SUBJ(I),I=1,25)
        WRITE(2,720)GRADE
        WRITE(2,730)(SCHOOL(I),I=1,40)
        WRITE(2,740)SCNO
        WRITE(2,750)SYNO
        WRITE(2,760)(DATE(I),I=1,8)
        WRITE(2,770)(YOU(I),I=1,30)
        WRITE(2,550)
        WRITE(2,555)(I,I=1,10)
        WRITE(2,556)
        WRITE(2,560)(J,(M(I,J,I1),I=1,10),J=1,10)
        WRITE(2,620)(MT(I,I1),I=1,10)
        WRITE(2,630)MTT(I1)
        WRITE(2,650)(PER(I,I1),I=1,10)
        WRITE(2,800)
        WRITE(2,810)(I,I=1,10)
        WRITE(2,556)
        WRITE(2,820)(J,(IPER(I,J,I1),I=1,10),J=1,10)
        IF(I1.EQ.1) GO TO 653
        WRITE(2,920)
        WRITE(2,930)(I,I=1,10)
        WRITE(2,940)
        WRITE(2,950)(J,(M1(I,J),I=1,10),J=1,10)
        WRITE(2,960)(MT1(I),I=1,10)
        WRITE(2,970)MTT1
        WRITE(2,980)(PER1(I),I=1,10)
        WRITE(2,990)
        WRITE(2,1000)(I,I=1,10)
        WRITE(2,1010)
        WRITE(2,1020)(J,(IPER1(I,J),I=1,10),J=1,10)
        WRITE(2,1030)
  653   WRITE(6,660)
        WRITE(6,670)
        WRITE(6,680)(NAME(I),I=1,30)
```

```
      WRITE(6,680)(NAME(I),I=1,30)
      WRITE(6,690)SEX
      WRITE(6,700)ID
      WRITE(6,710)(SUBJ(I),I=1,25)
      WRITE(6,720)GRADE
      WRITE(6,730)(SCHOOL(I),I=1,40)
      WRITE(6,740)SCNO
      WRITE(6,750)SYNO
      WRITE(6,760)(DATE(I),I=1,8)
      WRITE(6,770)(YOU(I),I=1,30)
      WRITE(6,550)
      WRITE(6,555)(I,I=1,10)
      WRITE(6,556)
      WRITE(6,560)(J,(M(I,J,I1),I=1,10),J=1,10)
      WRITE(6,620)(MT(I,I1),I=1,10)
      WRITE(6,630)MTT(I1)
      WRITE(6,650)(PER(I,I1),I=1,10)
      WRITE(6,800)
      WRITE(6,810)(I,I=1,10)
      WRITE(6,556)
      WRITE(6,820)(J,(IPER(I,J,I1),I=1,10),J=1,10)
      IF(I1.EQ.1) GO TO 519
      WRITE(6,920)
      WRITE(6,930)(I,I=1,10)
      WRITE(6,940)
      WRITE(6,950)(J,(M1(I,J),I=1,10),J=1,10)
      WRITE(6,960)(MT1(I),I=1,10)
      WRITE(6,970)MTT1
      WRITE(6,980)(PER1(I),I=1,10)
      WRITE(6,990)
      WRITE(6,1000)(I,I=1,10)
      WRITE(6,1010)
      WRITE(6,1020)(J,(IPER1(I,J),I=1,10),J=1,10)
      WRITE(6,1030)
519   WRITE(1,520)
520   FORMAT(1X,'Do you wish to record another matrix (Y,N)?')
      READ(3,530)ANS3(1)
530   FORMAT(A1)
      IF (ANS3(1).NE.78) GO TO 516
      STOP
      END
```

FLANDERS SYSTEM OF INTERACTION ANALYSIS

CODE:	OBSERVED BEHAVIOR:
1	Teacher accepts feeling
2	Teacher praises or encourages
3	Teacher accepts or uses ideas of students
4	Teacher asks questions
5	Teacher lectures
6	Teacher gives directions
7	Teacher criticizes or justifies authority
8	Student talks--response
9	Student talks--initiation
10	Silence or confusion

DATA SUMMARY

Teacher Name: Doe, Jane
Teacher Sex: F
Teacher ID Number: 12345
Teacher Subject: English
Grade: 10
School: Anywhere High School
School Number: 1234
System Number: 123
Observation Date: 09/29/87
Observer: Miles, S.

DATA MATRIX

	1	2	3	4	5	6	7	8	9	10
1/	0	0	0	0	0	0	0	0	0	0
2/	0	0	0	0	0	0	0	0	0	0
3/	0	0	0	0	0	0	0	0	0	0
4/	0	0	0	0	7	1	0	0	1	2
5/	0	0	0	1	107	4	1	0	26	13
6/	0	0	0	0	7	3	0	0	2	0
7/	0	0	0	0	1	0	0	0	0	0
8/	0	0	0	0	0	0	0	0	0	0
9/	0	0	0	7	17	2	0	0	94	7
10/	0	0	0	3	12	2	0	0	4	75
TOTALS:	0	0	0	11	151	12	1	0	127	97
MATRIX TOTAL =	399									
PERCENT:	0.0	0.0	0.0	2.8	37.8	3.0	.3	0.0	31.8	24.3

PERCENTAGE MATRIX

	1	2	3	4	5	6	7	8	9	10
1/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4/	0.0	0.0	0.0	0.0	1.8	.3	0.0	0.0	.3	.5
5/	0.0	0.0	0.0	.3	26.8	1.0	.3	0.0	6.5	3.3
6/	0.0	0.0	0.0	0.0	1.8	.8	0.0	0.0	.5	0.0
7/	0.0	0.0	0.0	0.0	.3	0.0	0.0	0.0	0.0	0.0
8/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/	0.0	0.0	0.0	1.8	4.3	.5	0.0	0.0	23.6	1.8
10/	0.0	0.0	0.0	.8	3.0	.5	0.0	0.0	1.0	18.8

DATA SUMMARY

Teacher Name: Doe, Jane
Teacher Sex: F
Teacher ID Number: 12345
Teacher Subject: English
Grade: 10
School: Anywhere High School
School Number: 1234
System Number: 123
Observation Date: 09/29/87
Observer: Miles, S.

DATA MATRIX

	1	2	3	4	5	6	7	8	9	10
1/	0	0	0	0	0	0	0	0	0	0
2/	0	0	1	0	2	0	0	7	4	4
3/	0	3	1	0	0	0	0	3	0	0
4/	0	3	1	2	10	1	1	5	0	2
5/	0	5	2	1	47	5	0	3	18	3
6/	0	3	0	0	9	10	4	1	1	2
7/	0	0	1	1	0	5	1	0	0	6
8/	0	2	0	16	1	3	0	13	0	3
9/	0	0	1	1	11	0	3	6	69	5
10/	0	3	0	5	4	5	4	0	4	61
TOTALS:	0	19	7	26	84	29	13	38	96	86

MATRIX TOTAL = 398

PERCENT:	0.0	4.8	1.8	6.5	21.1	7.3	3.3	9.5	24.1	21.6

PERCENTAGE MATRIX

	1	2	3	4	5	6	7	8	9	10
1/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2/	0.0	0.0	.3	0.0	.5	0.0	0.0	1.8	1.0	1.0
3/	0.0	.8	.3	0.0	0.0	0.0	0.0	.8	0.0	0.0
4/	0.0	.8	.3	.5	2.5	.3	.3	1.3	0.0	.5
5/	0.0	1.3	.5	.3	11.8	1.3	0.0	.8	4.5	.8
6/	0.0	.8	0.0	0.0	2.3	2.5	1.0	.3	.3	.5
7/	0.0	0.0	.3	.3	0.0	1.3	.3	0.0	0.0	1.5
8/	0.0	.5	0.0	4.0	.3	.8	0.0	3.3	0.0	.8
9/	0.0	0.0	.3	.3	2.8	0.0	.8	1.5	17.3	1.3
10/	0.0	.8	0.0	1.3	1.0	1.3	1.0	0.0	1.0	15.3

TOTAL OF MATRICES

	1	2	3	4	5	6	7	8	9	10
1/	0	0	0	0	0	0	0	0	0	0
2/	0	0	0	0	0	0	0	0	0	0
3/	0	0	0	0	0	0	0	0	0	0
4/	0	0	0	0	7	1	0	0	1	2
5/	0	0	0	1	107	4	1	0	26	13
6/	0	0	0	0	7	3	0	0	2	0
7/	0	0	0	0	1	0	0	0	0	0
8/	0	0	0	0	0	0	0	0	0	0
9/	0	0	0	7	17	2	0	0	94	7
10/	0	0	0	3	12	2	0	0	4	75
TOTALS:	0	0	0	11	151	12	1	0	127	97

CUMULATIVE TOTAL OF ALL MATRICES: 399

PERCENT:	0.0	0.0	0.0	2.8	37.8	3.0	.3	0.0	31.8	24.3

AVERAGE PERCENTAGES OF ALL DATA

	1	2	3	4	5	6	7	8	9	10
1/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4/	0.0	0.0	0.0	0.0	1.8	.3	0.0	0.0	.3	.5
5/	0.0	0.0	0.0	.3	26.8	1.0	.3	0.0	6.5	3.3
6/	0.0	0.0	0.0	0.0	1.8	.8	0.0	0.0	.5	0.0
7/	0.0	0.0	0.0	0.0	.3	0.0	0.0	0.0	0.0	0.0
8/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/	0.0	0.0	0.0	1.8	4.3	.5	0.0	0.0	23.6	1.8
10/	0.0	0.0	0.0	.8	3.0	.5	0.0	0.0	1.0	18.8